SOIL conservation

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Design for quality

There is no alternative to high quality work by SCS people in all disciplines. This is especially true in the engineering field, where errors in design are readily translated into problems in construction.

The demand for SCS engineering assistance in natural resource-related work remains very high. Among our major contributions in this field are the design of ponds, terraces, irrigation and drainage systems, agricultural waste management systems, and small watershed flood prevention projects.

In all engineering work, there must be a careful consideration—a balancing—of several major factors. We must, of course, design structures and facilities that are technically adequate, that are safe, and that do their intended job. Our designs must provide users with the maximum return for the money invested; frills and superfluous additions are not acceptable. But we do consider it both necessary and desirable to "design in" the preservation of scenic and other natural visual resources as well as the preservation of desirable wildlife habitat, on a long range basis, at the engineering site.

We must, in other words, give full weight to the triple values of consistently high quality in our design work; a good return for the monies expended; and a full consideration of all nonmonetary values that will be affected.

I am very proud of the dedication, expertise, professional reputation, and high standards of SCS engineers. The tremendous performance of PL-566 flood prevention structures during Hurricane Agnes and other natural disasters typifies the quality of SCS design work.

But the past is prologue. We must be constantly alert to incorporate into our work new information, concepts, and skills. We are, along with many people in the natural resource field, taking a closer look at possible nonstructural methods for solving flood-related problems. We are continuing to insist on engineering design work that is environmentally acceptable, and we are placing a higher priority on incorporating esthetic values into all engineering and conservation projects with which we are associated.

Kenneth E. Grant

SOIL conservation

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COVER: The efficient use of irrigation water is one aspect of conservation. Here, a Utah farmer adjusts sprinkler nozzles in his apple orchard. Pomar (dwarf) orchardgrass is a permanent ground cover between trees. For more on irrigation, see centerfold.

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EARL L. BUTZ, Secretary of Agriculture.

KENNETH E. GRANT, Administrator, Soil Conservation Service

CAROLYN M. JOHNSTON, Editor

MARYELLEN BERTRAM, Editorial Assistant

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A dune is reborn

by Vincent J. Price
Information Division, SCS
Washington, D.C.

Visitors to the famed art colony of Ogunquit, Maine, were startled this April as they strolled on the beach. Contemplating the bounding main, gulls, the wind, and the dunes, their reveries were disturbed by the unmistakable roar of bulldozers.

Bulldozers? On Ogunquit Beach? Was quiet Ogunquit turning into another Atlantic coast seaside resort of high-rise condominiums? But Ogunquit was supposed to be preserved!

Indeed it was. And Ogunquit Beach will be more than preserved. The dunes of Ogunquit will be restored to a much better condition through the work of the Threshold to Maine Resource Conservation and Development (RC&D) Project. More than half a million dollars of federal funds will go into the project, but local people are confident the investment will be repaid many times over in years to come.

More people, shrinking dunes

The story of the Ogunquit dunes began 70 years ago, when artists and other newcomers first "discovered" the village and its beach. At that time the dunes, more than a mile long, were perhaps 40 to 50 feet high and covered with dense tough beachgrass. In front of the dunes stretched a beach which, at low tide, was 300 feet wide. Behind lay the Ogunquit River, a tidal estuarine area brimming with soft-shell clams.

As the population increased, however, conditions changed on Ogunquit Beach. Sunbathers and other summer visitors began trampling the dunes and inadvertently killing the soil-holding beachgrass. As the grass thinned, stiff ocean breezes lifted the fine dune sands and blew them inland into the river or out to sea.

The dunes began to shrink—slowly at first, then faster. "I've watched these dunes grow smaller and smaller over the last 20 years," says Brad Sterl, a marine resources scientist with the Maine Department of Marine Resources. "The town talked about doing something, but we never could get the money."

Last year . . .

By the summer of 1973, the dunes were almost bare of grass and only 12 feet above sea level. Storms had breached them and the Ogunquit River was choked with sand, smothering acres of clam flats. Visitors decreased when sands whipped along the beach, and millions of dollars of annual income from the tourist trade were endangered.

At that point, Jack Dannert, corporation manager of the Ogunquit Village Corporation, aproached the Threshold to Maine RC&D Steering Committee with the problem. The

committee agreed to fund an RC&D project to control dune erosion, restore a productive shellfish area, and prevent sediment obstruction of the Ogunquit River channel.

The basic plan was to rebuild the dunes to a height of 22 feet and immediately stabilize them by planting beachgrass. Much of the sand for dune rebuilding would come from the bed of the Ogunquit River. This also would restore acres of channel to productive clam beds.

Many voices

The "save the dunes" project caused discussion throughout the state. The Southern Maine Regional Planning Commission advocated its implementation as soon as possible. The Maine Audubon Society advised the planners on wildlife. According to the Society, the revegetated dunes will provide excellent habitat for eastern piping plovers and spotted sandpipers if nesting sites are protected from human disturbance during the breeding season. Eastern least terns and savannah sparrows might also utilize the dunes.

Comments also came from the Rachel Carson National Wildlife Refuge, which abuts the project area, the USDA Forest Service, the Maine Wetlands Control Board, and a dozen other agencies.

The final plan called for all engineering and construction costs to be met by RC&D funds. The local sponsors, the Ogunquit Village Corporation, and the York County Soil and Water Conservation District would pay their own administrative costs, and the village agreed to maintain the dunes at an annual cost of $4,000.

Construction work on the project began this April.

How a dune is built

First, giant "pans" scrape sand off the riverbed and haul it to the beach. Working in tandem, the pans can remove 7,000 cubic yards of sand a day.

As sand fill is being placed in the dune, riprap is laid along 500 feet of the river edge to protect the fill from the tidal currents. A 1-foot thickness of gravel is placed under the riprap to prevent high tides in the river from carrying the fine sand through the rocks and undercutting the shoreline.

Meanwhile, stakes are being laid out along the primary frontal dune and bulldozers are pushing the sand into place. Sidney Emery of the Soil Conservation Service and Brad Sterl of the Marine Resources Department monitored this operation.

"We removed 5½ acres of bar," Sterl reports. "If we can reclaim 3 or 4 acres of that area for clams it will be worthwhile. You can get 200 or 300 bushels of clams per acre a year from these beds, and the current price of clams is $5 to $6 a peck."

Planting a dune

After bulldozers raised the fore dunes to 22 feet above mean sea level, American beachgrass was hand-planted at the rate of 58,000 plants to the acre or more than 1.6 million sprigs of grass for the entire project.

The contractors worked against time because beachgrass can be successfully transplanted only when dormant,

A bulldozer builds up the fore dunes.

Gravel under the riprap protects the sea-sand from tidal currents.

Tough American beachgrass to stabilize the dunes.

which is before May 1. Since they could not start before late April, the plantings had to be made in less than 2 weeks.

Only part of the dune building and grass planting was done during the short working period this year. It will be completed next spring.

The back dune will not be seeded. "In terms of soil erosion, it all ought to be covered with grass," SCS District Conservationist Earland Morrison says, "but a compromise was made to give people a dune area for hiking and painting."

Snow fencing will keep people off the fore dune and the village will patrol the beach. "If you can't keep people off the dunes, you're defeating your whole purpose," says Sterl, "because grass is the main dune stabilizer." Rugosa rose planting will eventually take over pedestrian control duties from the snow fence and will form an attractive natural barrier to protect the dunes.

No guarantee

Planners and conservationists point out that the project has no automatic guarantee of success. Shifting sand is always an uncertain factor. Sterl says, "If you work with a stable inland area putting a pile of dirt down, shaping it, and planting it, it'll stay there. With sand dunes it's different."

But with tough grass forming a protective mat to hold the sand, conservationists hope to restore the dunes to much of their former majesty. As SCS Conservation Technician Emery puts it, "We've got a lot of coastline around here, but it's mostly rocks. Ogunquit has been one of the most beautiful beaches in Maine. We want to keep it that way." ♦

Hundreds of communities needlessly get "wet feet" every time there is a heavy rain.

Examples of these flood-prone subdivisions can be found throughout the country. Often, they are the result of poor site selection or unrecognized soil and water problems.

One subdivision in the Tampa, Florida, suburb of Brandon avoided the "wet feet" problem after its planners and engineering consultants sought soil and water management advice from the Soil Conservation Service. Instead of battling excess water and rising water tables during the rainy season they cooperated—intelligently—with nature.

The result is that subdivision homeowners now have an attractive series of lakes to help their homes stay dry and to make their area more pleasant and less flood prone.

About 2 years ago, when the developer's consulting engineers were beginning design work on the 100-acre site, SCS held a soils and engineering workshop in Tampa, sponsored by the Hillsborough Soil and Water Conservation District. City and county engineers, planners, sanitarians, and private engineers were among the participants.

Members of the subdivision's consulting firm found this information was of direct help to them in developing certain parts of their design. The workshop helped them to better understand and use the published soil survey data and to discover how the site's wetness problems could work for, rather than against, them.

From the workshop information and further contact with the local SCS district conservationist, the consultants were

Keeping a Florida subdivision low and dry

by James N. Krider
Watershed planning party leader, SCS
Gainesville, Florida

able to determine fluctuations in the water table, flooding hazards, soil permeability, and the amount of water storage in the soil profile. They also were able to locate the best sites for excavated, aquifer-fed lakes and for onsite sources of road-fill material.

Based on SCS advice, the consulting engineers then designed a system of lakes coupled with a subsurface drainage system.

The lakes provide storage for rainfall and surface runoff, keeping most of the excess water right on the site. Consequently, the flooding potential in downstream areas is significantly reduced.

The subsurface drainage system lowers the natural water table, providing storage of stormwater in the soil profile and decreasing the peak runoff that would otherwise occur. The system also provides some extra benefits including the stabilization of home and roadway foundations and better water management for the owners' lawns, shrubs, and gardens.

The consulting engineer summed it up this way: "This was a chance to apply the drainage concepts, originated by the SCS through years of experimentation on agricultural problems, to the expanding environment of suburban America. It represents the ideal integration of the expertise of government conservation specialists and private engineers in the development of a suburban drainage methodology.

"In this particular project, we feel that the end result of our joint efforts will be a better use of the land to provide housing for a rapidly increasing suburban population while minimizing the adverse impact of suburban development on the environment." ♦

On the trail to Observation Point, Zion National Park.

Studying soil-plant relationships in Zion

by Vear L. Mortensen
Soil scientist, SCS
St. George, Utah
and Lamar R. Mason
Range conservationist, SCS
Salt Lake City, Utah

"In an instant, there flashed before us a scene never to be forgotten. In coming time it will, I believe . . . be regarded as the most exquisite of its kind which the world discloses. The scene was the temples and towers of the Virgin."

Thus wrote Captain Clarence E. Dutton of the U.S. Geological Survey in a report published in 1880.

Captain Dutton was referring to the Virgin River which has cut a spectacular straight-walled canyon through a massive layer of sandstone to form Zion Canyon, the heart of Zion National Park.

Today, the soil-plant relationships of that canyon are being studied.

The average visitor to Zion National Park in southwest Utah doesn't associate the towering red sandstone cliffs and massive bare rock formations with deep soils, growing trees, shrubs, and grasses. But, on the higher terraces and plateaus, accessible only to the more adventurous visitor by four-wheel drive or foot trails, there are beautiful stands of ponderosa pine, Gambel oak, sagebrush, and grasses.

Undisturbed areas like this make excellent locations to study basic soil and plant relationships because the native plant communities have reached a nearly stable climax state.

In 1966, the National Park Service and the Soil Conservation Service agreed to a 10-year study of these so-called relict areas. A special soil survey report was prepared by the SCS, and soil maps and interpretations were presented to the National Park Service for its use.

Another part of the 10-year study has been a joint Soil Conservation Service — Park Service effort to obtain information on the climax composition and yield of native plants on various soil and range sites in the area. Studies have been made in relict areas with such intriguing names as Hepworth Wash, Deertrap Mountain, Potato Hollow, Kolob Canyons, and Checkerboard Mesa.

At each study location, pits are dug to expose soil horizons. Plants growing on each kind of soil are classified and the amount of vegetation is compared with the same year's precipitation. The plant climax is determined by analyzing this and other types of information.

The results of this work have been used in Zion National Park and surrounding areas to make estimates of forage and timber yields and to aid in managing wildlife.

The information will help planners to establish and maintain a stable relationship between soil and plants. It can also be used by park officials to help develop new trails or scenic areas.

Most important, natural ecosystems and natural beauty can be maintained better when we know more about the original soil-plant relationships. If a delicate balance between use and protection is observed, the wonder of the world, known as Zion National Park, can be preserved for generations to come. ◆

Women at work-- Outdoors

by John Cross
Information specialist, SCS
Lincoln, Nebraska

Pamela Kohnken interviews owner of flood damaged property in Prescott, Arizona.

The mud, dust, and sweat of a job outdoors doesn't bother the women conservationists of the Soil Conservation Service. They're more at home jumping ditches than they are juggling deskwork.

Until recently all SCS technical field positions—the "outdoors" jobs—were done by men. But no more! Today, at least 24 boots-and-britches women work as soil conservationists, soil scientists, economists, engineers, or technicians.

Selden Cowan is one "for example". A graduate of the University of Wisconsin agricultural department, she spends her days outdoors digging into the fertile, varied soils of Eaton County, Michigan. To her, soil isn't "dirt" but an alive, fascinating, and basic part of the environment.

Selden's present job is to identify and map hundreds of different soil types so that—as part of the Eaton County soil survey—hundreds of other people can benefit from her knowledge when they use "dirt" to grow crops, build new homes, or for other land uses. She's as familiar with Brookston loam, Hoytville clay, and other soil types as most women are with cooking or cosmetics.

Roberta (Bobbi) Stevenson of Arizona specialized in agronomy when she attended the University of Arizona. Her first SCS job was as an agronomy assistant developing and testing grass varieties. She did all the other chores required, including harvesting and cleaning seed and hoeing weeds. Today, she's a soil conservationist at the SCS field office in Yuma, Arizona, helping farmers and ranchers apply soil and water

Susanne Leckband operates transit for vertical control on drainage project.

conservation practices to their lands.

Mrs. Susanne Leckband of Colorado is an agricultural engineer who surveys and designs ponds, irrigation systems, and erosion control structures.

Peg Whiteside is a soil mechanics engineer working in Madison, Wisconsin. She tests soils, in both field and laboratory, to determine their suitability for use in dams and other structures.

Pam Kohnken gets involved in the economics aspects of watershed and river basin work in Phoenix, Arizona. A graduate of the University of Denver, she is currently taking night courses at Arizona State to earn a master's degree in economics. Wading in mud to gather data after floods have occurred is a common assignment.

How well are women accepted in jobs traditionally held by men? "Farmers very soon see me as a person," says Susanne Leckband, the agricultural engineer. Gil Landtiser, Selden Cowan's soil survey supervisor, says he doesn't care what sex his soil scientists are, as long as they do high quality work. Selden does.

The women agree they like being outdoors. But sometimes their job takes them to schools, garden clubs, and other organizations that want help on environmental matters from the Soil Conservation Service. Selden says that, whereas most women slip into slacks or shorts to relax, she puts on a dress.

How do these outdoor-oriented women relate to the traditional female values of home, marriage, and children?

Susanne is a wife and mother with a "very interesting" husband and a daughter Michel Ray. Just before Michel was born, she had to stand back a bit from the surveying instrument, but that was the only necessary adjustment. She is, also, the only SCS field technician ever to take maternity leave.

Marriage and children don't interest Peg at the moment, while "that comes later," says Selden.

Choosing a career in conservation was easy for most of them. Susanne likes the people, the work, and the challenges. Bobbi wants to be ready for greater responsibility when the time comes. And Selden says she doesn't expect to be boring holes in the soil all her life but does want to continue in some capacity as a soil scientist.

All of the women appreciate being treated like ladies. Yet their men supervisors don't hesitate to send them out into mud or snow to get a job done—and they appreciate that too.

The women add that there's little time to think about "being different" because the conservation job is so demanding it absorbs their eight to five energies. They become absorbed in the problems of erosion, sedimentation, and environmental problems as their male colleagues do.

And—as with men—there's always soap and water to solve the problems of mud, dust, and sweat at the end of the day. ♦

IRRIGATION

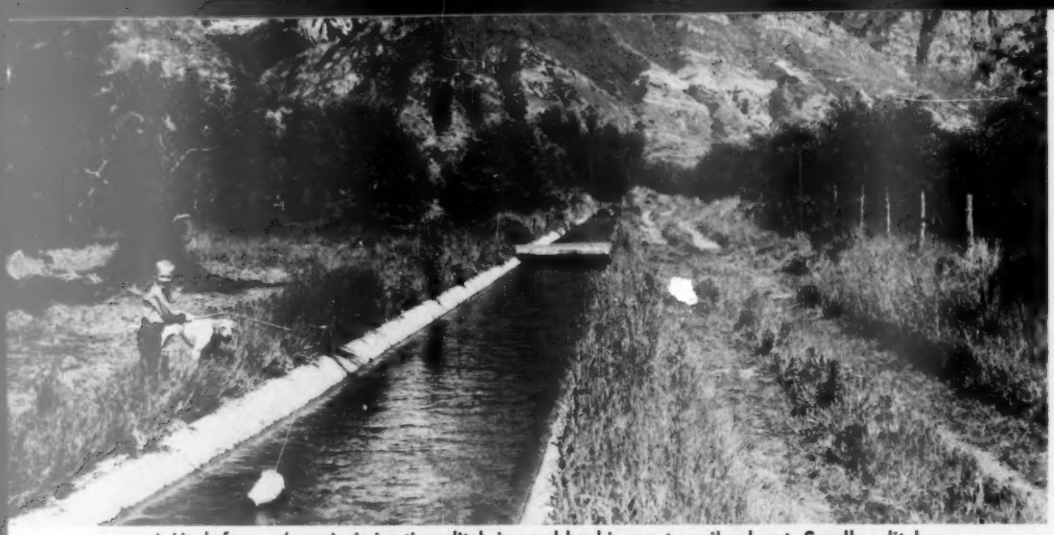
Since before recorded history, man's desire to make dry land "bloom like a rose" has triggered interest in irrigation systems. Today, about 10 percent of U.S. land in cultivation is under some form of irrigation. In the 10 western states, about 80 percent of water consumed—not used but consumed—goes for irrigation use.

There are a number of irrigation systems, adapted to different climates, terrains, cropping systems, or soil conditions. Some systems are thousands of years old, while others incorporate sophisticated 20th century techniques to provide more coverage with less water wastage.

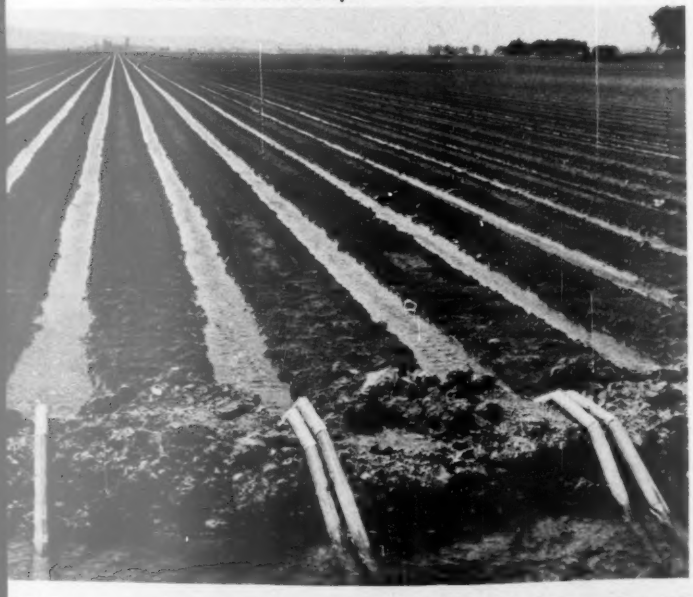
In the United States, about 78 percent of all irrigation is done by surface methods and about 22 percent by sprinkler systems—but the number of sprinkler irrigators is increasing. Soil Conservation Service engineers and soil and water specialists help farmers and ranchers to design, adapt, and use the most suitable methods for their land.

For examples of irrigation methods, please turn the page. ♦

From the initial water source, to the main irrigation canal, to the smaller supply ditches or sprinklers, down to the farmfields, truck gardens and orchards, irrigation water flows, spurts, or squirts in many different ways to its ultimate destination. [illegible] a "ditch rider" in Lyon [illegible]y, Nevada, works a headgate to start irrigation water on its way to someone's land.



A Utah farmer's main irrigation ditch is used by his son to sail a boat. Smaller ditches run across the field at right angles to the main ditch and siphon tubes transfer water from there to the crops.

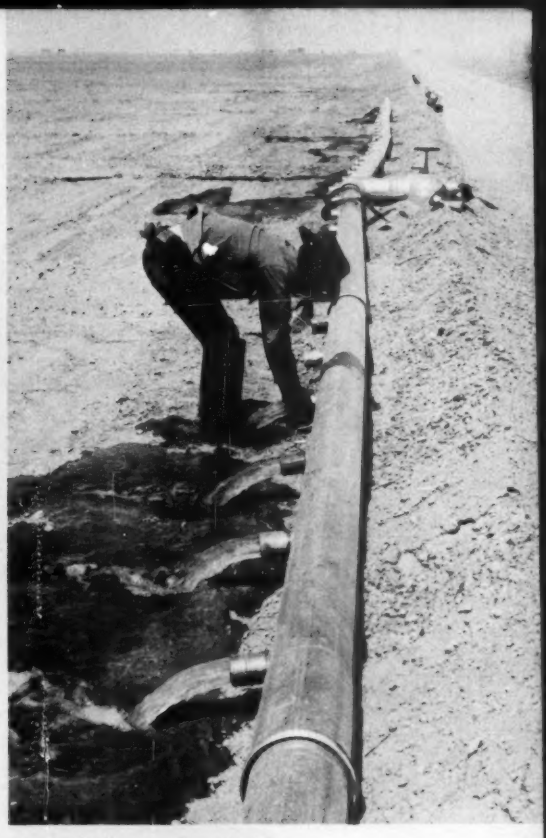


Furrow irrigation (left) in Lompoc Valley, California. Siphon tubes bring water to this field of carrots. The amount depends on size of the tubes and difference in elevation between irrigation ditch and furrow. This method is adapted to any row crop. On rolling land, contour furrows—curved to the land—are used.

Drip irrigation (below left) keeps plant root zone moist but not saturated to reduce water waste and soil erosion. The dripper, shown here, provides a slow, steady release of water. The method is used for high-value crops, such as these California avocado trees, in areas with high water costs, rough terrain or problem soils. It's also adapted to home gardening and landscaping.

Contour basin (below right). Dirt borders, that follow the contours of the land, are scooped out and basins flooded with water. The technique is old but effective.

A circle sprinkler irrigation system (above) on Oregon wheatland. Nozzles direct water downward to reduce the effect of wind. The system can be set to irrigate 138 acres in either 11 or 22 hours. Because of control over water drift, this irrigation method is sometimes used to dispose of treated sewage effluent.



Right, border or "flood" irrigation in Reeves County, Texas. The irrigator is turning on openings in a gated pipe which is attached to a hydrant behind him. The hydrant connects surface pipe to an underground pipe under the dirt ridge. Other ridges, perpendicular to the pipeline, separate the farmfield into long strips—anywhere from 15 to 200 feet apart—for ease in irrigating. This picture was taken in early spring and shows a field prior to planting.

A center pivot sprinkler irrigation system in Cochran County, Texas. These systems make a complete 360° circle over a field in a set period of time. Many are 1,200 feet long with towers (see right) and sprinklers every 100 feet, and can irrigate a half mile in diameter, or approximately 130 acres, in one complete revolution. Some systems have a trailing boom which straightens to irrigate corners in a square field. Here, a technician checks pressure of the "big gun" sprinkler nozzle. Too little pressure means not enough water for crops and possible soil compaction; too much breaks water into fine particles that are blown away. Over 1½ million acres of land are irrigated this way.

Soil protection for spud production

by Norris D. Braley
District conservationist, SCS
Presque Isle, Maine
and Duane A. Smith
Extension economist
University of Maine

Potatoes are a profitable crop this year and farmers in Aroostook County, Maine—a top potato-growing area—have no complaints about that. They're increasing total potato acreage—but they're doing it the right way this time.

Risk — hard going — that's potato farming. In the past, good farmers could count on a profit from their crop only 2 years out of 10. Farmers who survived this attrition are understandably anxious to produce more now that prices are up. But as they produce more, farmers are also protecting their land more, thanks to an all-out campaign to promote good crop rotation.

At one time most Maine potato farmers did alternate their crops. Often they operated a small livestock enterprise and would plant part of their land to grain for feed.

During World War II, however, an all-out effort to produce potatoes stimulated farmers to try continuous cropping. This continued after the war and the results were devastating to the land.

The biggest problems occurred in central Aroostook County, an area covered by the Central Aroostook Soil and Water Conservation District. The land is rolling, with highly erodible soil that is fairly shallow to bedrock. Studies made in 1940 and 1964 indicated that some fields had lost 20 inches in 24 years. And this was on land that had no soil to waste in the first place.

Soil Conservation Service conservationists warned that one-crop farming was causing irreparable damage, but many farmers felt they couldn't afford to change. They were living too close to foreclosure already, and a further loss in income might mean the end of any farming at all.

Two years ago the Central Aroostook SWCD, the Soil Conservation Service, and the Cooperative Extension Service tried a new approach—an all-out campaign to explain why crop rotation was more profit-

able than the old one-crop system.

Assisted by the Agricultural Stabilization and Conservation Service and the Production Credit Association, SCS and Extension people barnstormed up and down the county speaking to farmers in terms of dollars and cents. Television shows were produced, news stories written, radio spots broadcast, and more than 50 group meetings held. The Maine Potato Council joined with USDA agencies to advocate crop rotation.

Meanwhile, the Extension Service worked on better methods of marketing the grain or hay used in crop rotation. Some farmers felt the only benefit from rotation was a higher yield of potatoes the following year. But new markets were found for wheat, buckwheat, and oats; so a man now can make a modest profit from harvesting these soil-stabilizers —and get a better potato yield the next year as well.

Potato farming is an expensive operation, costing several hundred dollars an acre each year. Unfortunately, the margin between the cost of producing an acre of potatoes and the prices the farmer receives for them is so narrow that a farmer may spend hundreds of dollars to raise an acre of potatoes, get hundreds of dollars for the potatoes, and still only break even, or maybe even lose money.

Crop rotation results in a better yield per acre of potatoes in those years when the land goes into potatoes. Thus, a farmer can produce more potatoes per acre without a significant increase in per-acre production costs. This provides him with a greater profit margin at less risk. It may mean the difference between making $75 an acre on 100 acres—or losing $25 an acre on 200 acres.

The experience of farmer R. H. McLaughlin illustrates a related benefit. "I was planting 110 acres a year to potatoes and wasn't making ends meet," he remembers. "I cut it down to 50 acres a year and now I'm making a living. Quality is the big difference. When you harvest a crop, if you can bag and sell it without losing a third of it as poor quality to the factories, then you can make it."

"Increased quality is a natural from rotation," reports Arnold Davis of Potato Service, Inc., a Maine based processing enterprise. "When you plant potatoes year after year, the soil becomes compacted under the weight of the machinery. This causes uneven potato growth. With rotation, you get

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Silt accumulation at the bottom of eroded potato field (far right). (Next), potato harvester in operation. Potatoes are separated from stones and vines, then transferred to large truck. (Bottom), stripcropping on Aroostook potato field.

a loose, friable soil that lets the tuber grow to its natural size."

Other benefits of rotation are:

—It reduces soil erosion.

—It reduces or eliminates several potato diseases such as silverscurf, scab, and early blight.

—It results in improved water intake into the soil, conserving moisture for any dry periods in late summer.

—The soil has more tilth and works more easily.

Nature also helped convince Aroostook farmers of the need for soil conservation. "Up to 10 years ago the overall average potato yield would be 164-180 pound barrels per acre," reports farmer Charles Knight. "But then we began to see diminished yields. I think farmers are beginning to agree that rotation is necessary for good long-term crop results."

This year hundreds of requests are coming from the farmers of central Aroostook for technical assistance with crop rotation, indicating that 1974 may be a banner year for conservation.

The results will be more potatoes, less soil erosion—up to 50 percent less—and a better living for the farmers. And the trend seems likely to continue.

"Within the next 3 or 4 years, you'll see a big difference in farming methods here in Aroostook," predicts farmer R. H. McLaughlin. "More rotation, more barrels an acre, and better quality potatoes. With good crops and a decent yield, a man can pay his bills and live the way he should." ♦

train-ing for conservation?

Colorado's high speed test center

by Rodney Alt
Area conservationist, SCS
Sterling, Colorado

High speed commuter trains, which may some day connect our major cities, are now being tested in a remote area of eastern Colorado, where the only communities are prairie dog towns.

The High Speed Ground Test Center is a unique facility encompassing 50 square miles of native rangeland. The Center, operated by the Federal Railroad Administration (FRA) of the Department of Transportation, is testing new long-range rail vehicles, some of which will attain speeds of 300 miles an hour.

The Center is also used by the Urban Mass Transportation Administration to test intracity trains.

The Federal Railroad Administration became a cooperator with the Turkey Creek Soil Conservation District in 1970 and requested SCS assistance in revegetating the sandy track rights-of-way on the test grounds. This resulted in the revegetation of approximately 250 acres of land.

FRA's project monitor, Ross Gill, was quick to realize that the 30,000-acre test center contained a wide variety of natural resources. He knew some major management decisions had to be made and he conferred with SCS specialists on the problems and possibilities.

For example:

The productive Colorado rangelands making up the Center produce enough forage annually to feed from 7,000 to 9,000 cows or their animal equivalents. If the land is not grazed, the large accumulation of dry forage can become a serious fire hazard. What's the answer?

The land is also home to a variety of wildlife species, including antelope. How would the high speed train testing affect them?

what will the prairie dogs say?

Prairie dogs inhabit three large towns of 640, 400, and 60 acres on Center land. A planned rail line will traverse the largest prairie dog town. What will the ecological repercussions be?

Some areas of the proposed development have complex soils and hydrologic conditions; these must be taken into account. And wind erosion can become a serious hazard on disturbed land areas because the soils are sandy—and the winds are of a high velocity.

Two years ago, the Federal Railway Administration entered into a reimbursable agreement with SCS to receive technical assistance on which to base a long-range conservation plan for the Center. The agreement includes provisions for onsite assistance by SCS in developing and applying sound conservation practices.

In 1972 and 1973, SCS resource specialists prepared a series of natural resource inventories for the Center. These can provide a basis for sound future planning.

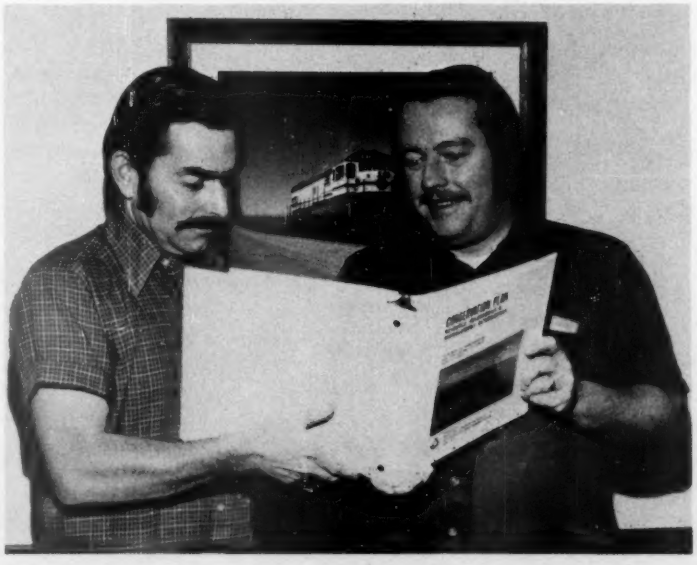
The resource inventories include information on climate, soil, vegetation, wildlife, geology, historic and archaeological values, recreation opportunities, hydrology, and revegetation potentials.

The Colorado Forest Service evaluated fire hazards and the requirements for an adequate fire control system.

The Colorado Division of Wildlife assisted in inventorying the Center's wildlife and made recommendations concerning the future management of wild animals.

The decisionmakers of FRA are presently evaluating the possible ways in which they can plan for the Center's future development.

Both FRA and SCS are optimistic that when the final decisions are made a sound conservation plan will be completed to protect the Center's facilities and make the best possible use of its resources.♦



Rodney Alt (left) and Ross Gill look over conservation plan for the test center.

Clean-up of a lake

by Richard L. Thompson
RC&D Project Coordinator, SCS
Kemmerer, Wyoming

Lake Viva Naughton, about 15 miles north of Kemmerer in southwest Wyoming, has been both a boon to fishermen and a headache to nearby ranchers. Now, thanks to community cooperation, camping and ranching can be good neighbors.

One reason for this turnabout was the help provided by members of the Western Wyoming Resource Conservation and Development Project (RC&D) in the area.

Lake Naughton is on the Hams Fork River which runs through the small city of Kemmerer. In 1941, Kemmerer built a dam across Hams Fork River, creating a 100-acre lake for municipal water storage. It was open to everyone for fishing and remained open until 1960 when it was closed due to water pollution and a general degradation of the nearby area.

In 1962, the Utah Power & Light Company constructed a much larger dam across the Hams Fork River a mile above the city dam. This created the new 1,458-acre Lake Viva Naughton. It was used for water storage and fishing also.

Lake Viva Naughton's reputation for yielding "big ones" spread, and fishermen flocked into the area. But, once again, pollution became a serious problem.

Local ranchers lost patience—along with thousands of dollars—when fishermen drove cars, trucks, and campers through their grain and hay fields. Because there were few camping facilities, visitors stopped for the night under the willows, along the lakeshore, or at any wide spot in the access road. And when they left for home, garbage and other refuse was strewn around the once-beautiful river and lakeshore.

The ranchers had only one choice left to protect their land; they fenced off a major part of the Hams Fork River shoreline.

the lake had big fish but the land had even bigger problems. it was being trashed to death.

At the same time, Utah Power and Light threatened to close the large lake to visitors because of pollution problems.

The city of Kemmerer, Utah Power & Light, and some of the ranchers considered two possible ways to rejuvenate the lake. One was to develop a public recreation area administered by the community; the other was to look for a reliable concessionaire.

The first idea was tried, but problems arose over which community group should administer the lake area.

Next, two Wyoming residents proposed that they operate the Viva Naughton Marina concession. The two men promised to save the lakeshore and develop the lake to full recreation use—if the community helped them overcome pollution problems.

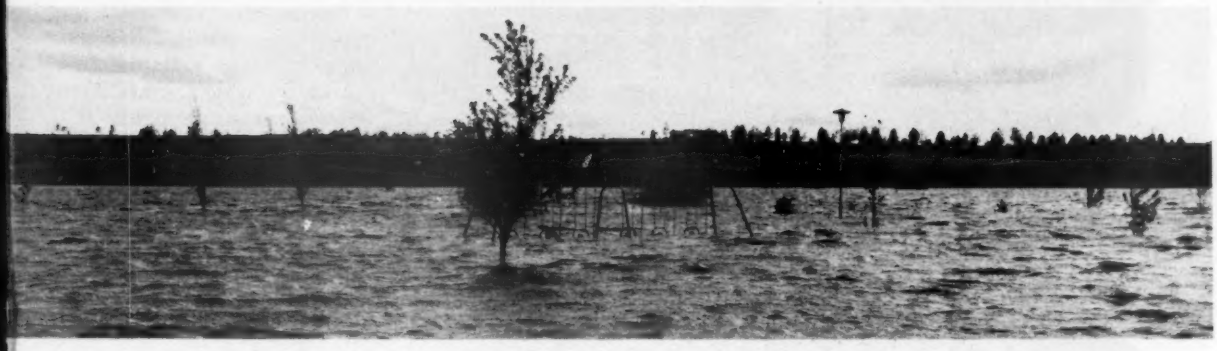
The RC&D and the Lincoln County Conservation District provided conservation and land use planning assistance. Soil Conservation Service specialists and field office personnel surveyed area soils, revised a number of separate conservation plans of landowners, incorporated the ideas of local people into plans for the marina, and drew up an area-wide conservation plan.

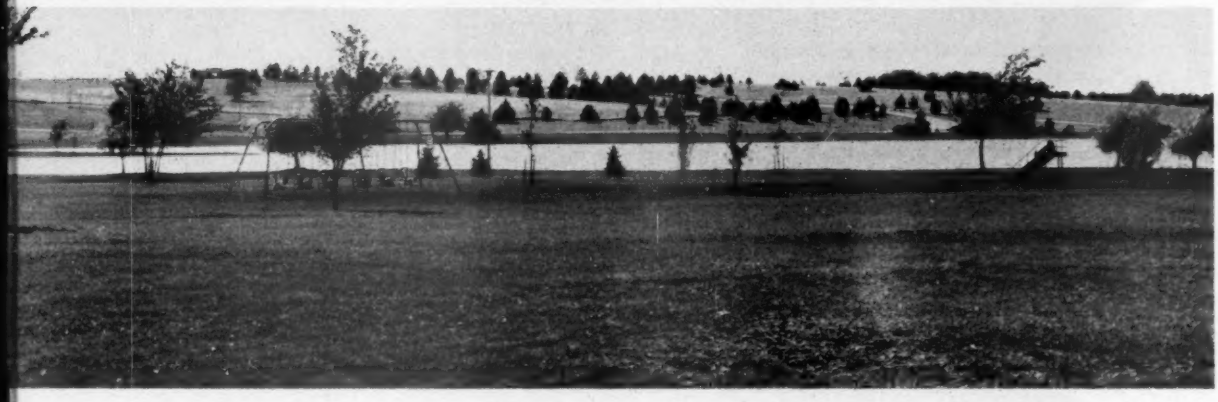
RC&D people also provided help on standard designs for buildings, boat ramps, and restroom facilities. And the Wyoming Game and Fish Department stocked the lake with 110,000 rainbow trout fingerlings.

In the spring of 1973, construction began on the marina. A well was dug, a complete sewage and garbage system was set up, and the entire area was fenced to keep out litterbugs. A cafe, showers, and other amenities were also completed.

In the first year, some 12,000 visitors have used the marina and camping facilities. As many as 500 campers remain at the lake overnight. Future plans call for A-frame summer houses to be built and rented, and an expansion of the lake itself.

The operation has boosted Kemmerer's economy, through increased sales of fishing gear, groceries, and other supplies. And, while a fee is charged to use marina facilities, campers seem to feel it's more than worth it. Their problem lake is now a popular recreation spot.♦





Top, the playground looked this way Friday, but (2nd) like this on Sunday—free of water and ready for use. (Left), a low point in the access road is under water, but 2 days later there's no evidence of water and no damage.

FLOOD PLAINS

PLAINS can be problem areas unless you accept the fact that they will periodically flood.

Homes built on flood plains can be wrecked or washed away, causing major financial and personal losses to homeowners. But there are other land uses—often including recreation—where flood losses can be minimal. Playgrounds, trails, and low-use roads, for example, are often among the better uses for flood plains.

These pictures, taken in Holmes Park, Lincoln, Nebraska, during and after a heavy rainstorm, illustrate this point. —By Charles V. Bohart, *recreation planner, SCS, Lincoln, Nebraska.* ♦

A new look for Santa Rosa Creek

by John W. Hanes
Engineering technician, SCS
Santa Rosa, California

Santa Rosa Creek is getting a face lift. And the fish couldn't be happier!

Severe bank erosion along Santa Rosa Creek, through Santa Rosa, California, is part of the reason. Earlier attempts to stop erosion by dumping trash and rubble concrete on the banks only made a public dump of the area—as well as "trashing up" the water for the steelhead trout which travel the creek en route to their spawning grounds upstream.

Clearly, Santa Rosa Creek had a problem.

The Central Sonoma Watershed Project provided the answer. Cosponsors of the project were the Santa Rosa Resource Conservation District and the Sonoma County Water Agency. They worked closely with the Soil Conservation Service and specialists in the California Department of Fish and Game, the U.S. Fish and Wildlife Service, and the Santa Rosa Planning Department.

Results? The new channel bottom has a 2-foot slope on one side to deepen summer flow. Four- to six-foot-wide boulders, placed at 40- to 50-foot intervals, make resting areas for fish migrating upstream during winter runs. The boulders also cause small gravel bars to develop, improving the stream's fish-oriented environment.

Fish shelters in the creek bottom help protect migrant fingerlings from predators. And fishways were constructed through hazardous areas.

Careful placement of rock riprap and brooming of the grout help avoid an artificial paved appearance. Planting wells are stocked with low maintenance plants that attract wildlife. Views from five bridges and a city park were considered in placing trees and shrubs.

A sprinkler system supports the vigorous plant growth and keeps it green. The city of Santa Rosa donates irrigation water and the Sonoma County Water Agency maintains the plantings. And the steelhead trout swim upstream and spawn successfully, unaware that Santa Rosa Creek's new look has helped them on their way. ♦

Tropical plants booklet goes worldwide

Major land use changes have come to the U.S. Virgin Islands in the last decade. New housing developments and new industries have increased such urban-oriented problems as denuded soils and uncontrolled water runoff.

What to plant to replace the bulldozed foliage became a high priority matter with local environmentalists. Lush, colorful vegetation isn't difficult to grow in the Caribbean climate; but, there are problems in knowing what plant is best for a specific area, how much salt tolerance a plant has, and how much moisture it requires.

Henry Williamson, former SCS district conservationist in the Virgin Islands, needed a publication that answered these questions. Williamson, his talented secretary, Carol Smith, and soil conservationist — photographer William Saalman combined their talents to produce a colorful new booklet "Selected Virgin Island Plants."

The 48 page booklet provides an authoritative guide to tropical plants for ground cover, barrier hedges, privacy screens, and windbreaks. The Virgin Island Soil Conservation District arranged for the Virgin Island Landmark Society to finance the printing costs.

Now in its second year of publication, the booklet has sold more than 1,700 copies. The same publication, under the title "Selected Tropical Plants" has sold 8,000 more copies in Florida, the West Indies, and South America.—By Gordon S. Smith, *information specialist, SCS, Upper Darby, Pennsylvania.* ♦

Recon . . .

The American Society of Planning Officials (ASPO) is currently involved in a research project dealing with the local approach to the regulation of sensitive environmental land areas. The project planners hope this will result in a handbook for local planning agencies that will identify possible regulatory approaches in the preservation or conservation of fragile land areas. The particular areas of concern are salt and fresh water wetlands, hillsides, streams and creeks, woodlands, and aquifer recharge areas. ASPO officials are interested in receiving information concerning "inputs" into effective local regulations or information on such regulations now in force. Interested readers can write to William Toner, American Society of Planning Officials, 1313 E. 60th St., Chicago, Illinois 60637.

Flax buffer strips on summerfallow protect land from wind erosion, especially during "blow days." This is the experience of Triangle Farms, Langdon, North Dakota, which had wind erosion on summerfallow acres in the fall and spring during the period of snow loss and the beginning of spring work. This "critical period" can damage land because the soil structure has been broken down by the freezing and thawing process. Field windbreaks of three rows of flax spaced 28 feet apart cover about 500 acres of summerfallow. If weeds become a problem, the land between can be cultivated. Use of the flax strips resulted in less wind erosion on the fallow acres and a more uniform snow cover, resulting in additional moisture.

Woodsman, spare that kenaf: a 10-foot tall member of a type of hibiscus may provide pulpmills and paper manufacturers with the "tree" of the future. The kenaf doesn't look like a tree or act like a tree, but USDA Agricultural Research Service researchers believe that the hardy hibiscus may share one very important characteristic of some trees: it provides an excellent fiber for paper manufacture. Growing to maturity in 4 months, compared to 20 years for many trees, the kenaf (pronounced kuh-NEF) produces five to seven times more pulp per acre per year than the pine tree. After 16 years of research effort to locate a suitable fiber substitute for trees, USDA scientists have zeroed in on the kenaf; honeysuckle and milkweed were two alternatives that were found unacceptable. Now scientists are working to eliminate a root parasite—the root-knot nematode—from the kenaf. If the parasite can be eliminated, the kenaf has the potential to supply some of America's increasing paper needs while preserving forest lands.

FACE for Wildlife is a new 4-H contest designed to establish food and cover for wildlife in Tennessee, announces James Byford, University of Tennessee wildlife specialist. "FACE means Food and Cover Establishment," explains Byford. Contestants' plots will be judged in October. The top three winners in Tennesse will each receive an engraved plaque, plus cash awards of $300, $200, and $100. Urban as well as rural 4-H members are encouraged to participate."

USDA plans five regional workshops on land use planning to stress the role of agencies in agriculture and land grant universities in this field.

These discussion conferences will be held between June and September 1974. Key USDA agency leaders will meet to consider the role of several agencies, including SCS, in providing information, and in working with other agencies and groups in a coordinated effort to help local people solve land use planning problems. The workshops are sponsored by the Department's Committee on Planning and Policy for Land Use and Land Conservation, established by Secretary's Memorandum 1807.

Review

Increasing Crude Protein Content of Forage with Atrazine on Shortgrass Range. By W. R. Houston and D. H. van der Sluijs. *1973. USDA Production Research Rpt. 153. 10 pp., illus. with graphs and charts. $0.25.* Atrazine is well known for its herbicidal action on annual grasses and forbs. Houston and van der Sluijs report the chemical is also able to increase crude protein concentration in many plants and may increase yields.

Annual Technical Conference Proceedings of the Sprinkler Irrigation Association. *1973. (13975 Connecticut Avenue, Suite 310, Silver Spring, Maryland 20906). 99 pp., illus.* $8. Presentations by industry and government specialists discuss a variety of topics including waste disposal system concepts, waste effluent research, sprinkler irrigation design concepts, and future agricultural systems.

Effect of Physical Soil Properties on Cotton Emergence—Prediction and Quantitative Description. By D. F. Wanjura. *1973. USDA Tech. Bull. 1481. 20 pp., illus. with graphs and charts.* $0.30. A wide range of conditions encountered during planting season across the Cotton Belt are detailed in this mathematical model for simulating emergence. Physical soil properties—temperature, moisture, soil physical impedance, planting depth—and their effects on cotton emergence are explained.

Soil surveys

Michigan

Emmet County. By Stanley D. Alfred, Adam G. Hyde, and Richard L. Larson. *1973. Soil Conservation Service in cooperation with Michigan Agricultural Experiment Station. 99 pp., illus.; maps.*

Mississippi

Pontotoc County. By H. C. Lane, W. E. Bright, M. C. Tyer, and W. I. Smith. *1973. Soil Conservation Service and Forest Service in cooperation with Mississippi Agricultural and Forestry Experiment Station. 72 pp., illus.; maps.*

New Mexico

Lea County. By Millard T. Turner, Dellon N. Cox, Brice C. Mickelson, Archie J. Roath, and Carl D. Wilson. *1974. Soil Conservation Service in cooperation with New Mexico Agricultural Experiment Station. 89 pp., illus.; maps.*

Hidalgo County. By Dellon N. Cox. *1973. Soil Conservation Service and Forest Service in cooperation with New Mexico Agricultural Experiment Station. 90 pp., illus.: maps.*

New York

Chemung County. By Carl S. Pearson, Russell A. Parsons, Norman B. Hulbert, Jr., and Wilfred C. Williams. *1973. Soil Conservation Service in cooperation with Cornell University Agricultural Experiment Station. 100 pp., illus.; maps.*

Pennsylvania

Susquehanna County. By Earl J. Reber. *1973. Soil Conservation Service in cooperation with Pennsylvania State University, Agricultural Experiment Station and Agricultural Extension Service, and Pennsylvania Department of Environmental Resources, State Soil and Water Conservation Commission. 89 pp., illus.; maps.*

South Dakota

Davison County. By Warren F. Johnson, James E. Kirk, Kenneth Miller, and Grayson E. Murphy. *1974. Soil Conservation Service in cooperation with South Dakota Agricultural Experiment Station. 70 pp., illus.; maps.*

Lake County. By Loren D. Schultz and James L. Driessen. *1973. Soil Conservation Service in cooperation with South Dakota Agricultural Experiment Station. 78 pp., illus.; maps.*

Tennessee

Meigs County. By Robert B. Warren. *1974. Soil Conservation Service in cooperation with Tennessee Agricultural Experiment Station. 71 pp., illus.; maps.*

Vermont

Chittenden County. By George W. Allen. *1974. Soil Conservation Service in cooperation with Vermont Agricultural Experiment Station and Vermont Department of Forests and Parks. 149 pp., illus.; maps.*

Washington

King County Area. By Dale E. Snyder, Philip S. Gale, and Russell F. Pringle. *1973. Soil Conservation Service in cooperation with Washington Agricultural Experiment Station. 100 pp., illus.; maps.*

Columbia County. By Eveard T. Harrison, Fred R. McCreary, and Frank L. Nelson. *1973. Soil Conservation Service in cooperation with Washington Agricultural Experiment Station. 88 pp., illus.; maps.*

Wisconsin

Fond du Lac County. By Ernest G. Link. *1973. Soil Conservation Service in cooperation with University of Wisconsin (Department of Soil Science), Wisconsin Geological and Natural History Survey, and Wisconsin Agricultural Experiment Station. 115 pp., illus.; maps.*

Deep tillage can break up most man-made soil pans, says George J. Buntley, University of Tennessee Extension specialist. "Subsoiling and chiseling are used on a wide range of soil conditions in Tennessee," says Buntley. "Deep tillage is practiced on soils free of pans, with natural pans, and with man-made pans. It can also greatly improve plow and traffic pans."

Meetings

June

2–5 *American Institute of Chemical Engineers, Pittsburgh, Pa.*
4–6 *International Exposition and Seminar on Water Resources Instrumentation, Chicago, Ill.*
5–6 *Keep America Beautiful, Inc., Birmingham, Ala.*
9–13 *Air Pollution Control Association, Denver, Colo.*
16–19 *National Watershed Congress, Pittsburgh, Pa.*
16–19 *American Institute of Biological Sciences, Tempe, Ariz.*
16–21 *American Water Works Association, Boston, Mass.*
16–21 *Ecological Society of America, Tempe, Ariz.*
23–26 *American Society of Agricultural Engineers, Stillwater, Okla.*
23–27 *National Environmental Health Association Annual Educational Conference, Cincinnati, Ohio*
24–26 *American Plywood Association, Portland, Oreg.*
24–28 *American Society of Civil Engineers National Symposium on Water Quality Planning, Ithaca, N.Y.*
24–28 *American Society for Testing and Materials, Washington, D.C.*
26–30 *Association of Consulting Foresters, Ocean Shores, Wash.*
28–July 3 *National Education Association, Chicago, Ill.*
29–July 3 *American Seed Trade Association, Inc., St. Paul, Minn.*
30–July 2 *American Society of Farm Managers and Rural Appraisers, Inc., (Summer Meeting), Boise, Idaho*
30–July 4 *American Society of Landscape Architects, Bal Harbour, Fla.*

July

1–2 *National Symposium on Water Resources Problems Related to Mining, Golden, Colo.*
8–17 *Second International Drip Irrigation Congress, San Diego, Calif.*
13–17 *American Association of Nurserymen, Inc., Toronto, Canada*
14–17 *National Association of Counties, Miami, Fla.*
16–17 *Keep America Beautiful, Inc., Colorado Springs, Colo.*
17–19 *Izaak Walton League of America, Huntington, W. Va.*
21–25 *Federation of Business and Professional Women's Clubs, Inc., Chicago, Ill.*
23–25 *National Conference on Flood Plain Management, Washington, D.C.*
25–26 *Great Plains Agricultural Council, Sioux Falls, S. Dak.*

August

11–14 *Conservation Education Association, Syracuse, N.Y.*
11–14 *National Farm and Power Equipment Dealers Association, Minneapolis, Minn.*
11–14 *Soil Conservation Society of America, Syracuse, N.Y.*
12–20 *Tenth International Congress of Soil Science, Moscow, U.S.S.R.*
14–16 *American Society of Civil Engineers, Irrigation and Drainage Conference, Biloxi, Miss.*
18–21 *American Institute of Chemical Engineers, Salt Lake City, Utah*
18–21 *American Agricultural Economics Association, College Station, Texas*

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June is busting out all over—including this irrigated Texas cornfield.